

# Descriptions and illustrations of some new and poorly known turrids (Gastropoda: Turridae) of the tropical northwestern Atlantic. Part 3. Genus *Crassispira* Swainson, 1840, subgenus *Crassiclava* McLean, 1971

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## ABSTRACT

Illustrations and descriptions of eight small turrids in the genus *Crassispira* Swainson, 1840, subgenus *Crassiclava* McLean, 1971, are provided. Five are described for the first time. All are from shallow water around islands of the southeastern Caribbean (between 10°–13° north latitude) and appear to represent an example of divergence among isolated island populations in a small geographic region. Species include *Crassispira* (*Crassiclava*) *affinis* (Reeve, 1846), *Crassispira* (*Crassiclava*) *asthenes* Faber, 2007, *Crassispira* (*Crassiclava*) *blanquilla* new species, *Crassispira* (*Crassiclava*) *cana* new species, *Crassispira* (*Crassiclava*) *mackintoshi* new species, *Crassispira* (*Crassiclava*) *masinoti* new species, *Crassispira* (*Crassiclava*) *multicostata* new species, and *Crassispira* (*Crassiclava*) *vexillum* (Reeve, 1845). Species are treated systematically and the island or island groups where they have been found illustrated to emphasize their very limited distributions and geographic proximity. The five reported here for the first time represent a sizeable range expansion of the known subgenus-group *Crassiclava* in the western Atlantic; and inasmuch as several islands along the north coast of South America have yet to be explored, additional species of *Crassiclava* may turn up.

*Additional keywords:* Neogastropoda, western Atlantic

overlap. Such diversity in *Crassiclava* has likely been fostered by the isolation of small populations that have direct developing non-planktonic larvae, and a habitat preference for the shallow water around islands separated from one another by deep water, likely a barrier to dispersal. The mode of development is only inferred here; however, Maes (1983: 322) states that the protoconch of a species in the same subgenus, *Crassispira* (*Crassiclava*) *apicata* (Reeve, 1845), suggests full intracapsular development.

The purpose of this work is to describe five previously undescribed species that belong in the subgenus-group *Crassiclava* McLean, 1971, to re-describe *Crassispira* (*Crassiclava*) *affinis* (Reeve, 1846), a little-known and misunderstood species, on the basis of specimens found that closely match Reeve's description (the type has not been located), and to re-describe *Crassispira* (*Crassiclava*) *vexillum* (Reeve, 1845) to provide a basis by which it can be compared to the other members of the subgenus. Another, *Crassispira* (*Crassiclava*) *asthenes* Faber, 2007, has been included for comparison purposes but its original description is sufficiently detailed and so not re-described here.

## INTRODUCTION

This is the third in a series of papers describing small relatively unknown or confusing crassispirine turrids. In this part, eight species in the subgenus *Crassiclava* McLean, 1971 are discussed, five new to science.

Recently, some heretofore undescribed crassispirines have been acquired from a rather small geographic region of the southeastern Caribbean, islands and areas near coastal South America that lie between 10°–13° N (Figure 1). Their close resemblance to one another and to known members of the subgenus suggests a close evolutionary affinity; most apparently limited in distribution to a single island or island clusters with no known

## MATERIALS AND METHODS

Materials and methods given in Part 1 of this series (Fallon, 2010), apply to this work. Since that publication, types located at the Natural History Museum (London) (NHMUK) have been examined and photographed for this work, in addition to specimens in the collections of the National Museum of Natural History (USNM) and Academy of Natural Sciences of Philadelphia (ANSP). St. Vincent and the Grenadines is abbreviated SVG herein.

## SYSTEMATICS

Subfamily Crassispirinae Morrison, 1966, *sensu* McLean, 1971a, b



**Figure 1.** Southern Caribbean *Crassispira* (*Crassiclava*) spp. localities. 1. Cabo de la Vela. 2. Los Monjes Is. 3. Aruba I. 4. El Supi, Paraguaná Peninsula. 5. Curaçao I. 6. Las Aves Archipelago. 7. La Tortuga I. 8. La Blanquilla I. 9. Los Tostigos Is. 10. Carriacou I., Ronde I., and Grenada I., Grenada, north to south. 11. Petit Nevis I., Baliceaux I., Canouan I., and Union I., SVG, north to south. 12. St. Vincent I., Young I. and Bequia I., north to south, SVG (not all appear on map).

Genus *Crassispira* Swainson, 1840  
Subgenus *Crassiclava* McLean, 1971

**Type Species:** *Pleurotoma turricula* G.B. Sowerby I, 1834 (synonyms: *P. corrugata* G.B. Sowerby I, 1834; *P. sowerbyi* Reeve, 1843), by original designation. Santa Elena, “western Colombia” (no coastal locality by that name is found in present day Colombia.)

**Remarks:** McLean placed two species from the west coast [eastern Pacific] in his new subgenus describing them as having a protoconch of 2.5 smooth rounded whorls; strong narrow axial ribs that arise at the whorl periphery, and extend to the following suture; fine spiral cords, strongest anteriorly where they are slightly nodulose at rib intersections; weakly noded subsutural cord; concave sulcus; thin outer lip, edge crenulated by spiral cords; shallow stromboid notch; deep U-shaped anal sinus, broad at its entrance, bordered by a large parietal callus; varix consisting of a thickened axial rib behind the anal sinus; inner lip raised; and a broad, deeply notched anterior canal. Furthermore, he identified two characters that separated this group from other eastern Pacific crassispirines: a strong parietal tubercle in front of a broad sinus entrance, and a radula with a well-formed central rachidian tooth and marginal teeth of modified wishbone or duplex type (McLean, 1971: 121). Later, Maes corrected McLean’s analysis of the radula, finding his central tooth was really two unhardened lateral teeth such that the radula of the subgenus has no central tooth (Maes, 1983: 321).

Although McLean believed that his group was confined to the tropical western Pacific, Maes recognized the radula of a tropical northwestern Atlantic (TNWA) species she identified as *Crassispira* (*Crassiclava*) *apicata* (Reeve, 1845) as very similar to that of *Crassispira* (*Crassiclava*) *turricula* (G.B. Sowerby I, 1834), the type of the subgenus (Maes, 1983: 322). The sculptural details of her specimens from the British Virgin Islands (Maes, 1983: fig. 15) differ somewhat in that axial ribs are weak, not strong, and extend well into the

sulcus, not ending at it. Kilburn soon afterwards added four species to *Crassispira* from the South African fauna (Kilburn, 1988: 239). His descriptions varied slightly from McLean’s original, in that the subsutural cord was absent to moderately strong, and the siphonal canal varies from unnotched to deeply notched in South African species.

In summary, members of the subgenus *Crassiclava* of the TNWA have shell characters consistent with those described by previous workers. They are crassispirines having: a strong parietal lobe in front of an open, U-shaped anal sinus; a weakly to moderately excavated sulcus without, or with spiral threads, some more swollen than others, or with a weak spiral cord; fine axial ribs that extend from the suture to the shell base, usually reduced and narrowed in the sulcus; spiral threads or incised lines in rib interstices; and widely spaced cords or ridges on the shell base, sometimes swollen or nodulose at rib intersections.

*Crassispira* (*Crassiclava*) *affinis* (Reeve, 1846)  
(Figures 2–15)

*Pleurotoma affinis* Reeve, 1846: pl. 34, fig. 309 (name attributed to Gray). The type could not be located; however, the coloration (“yellowish”), extrapolated size (11.8 mm), and locality (“St. Vincent”) of Reeve’s species are consistent with the specimens described here (see comparison in Figures 2, 3). Beau (1858: 8); Krebs (1864: 7); Paetel (1888).

*Mangelia affinis* “Gray”: H. & A. Adams (1853: 99).

*Drillia affinis* “Gray”: Tryon (1884: 194; pl. 21, fig. 22).

*Pleurotoma affinis* “Gray”: Dall (1885: 232).

*Crassispira apicata* auct. non (Reeve, 1845): misidentification by Fallon (2008: 12, figs. 21a–c).

Not *Crassispira* (*Crassispirella*) *affinis* (Reeve, 1846): Altena (1975: 63, pl. 7, figs. 5, 6).

Not *Crassispira affinis* (Reeve, 1846): Williams (2005: number 3130, except the inset in the left photo, which is Reeve’s drawing); Faber (2007: 123, figs 10, 11, 18).

**Description:** A 12.3 × 5.0 mm specimen is described here (Figures 4–5) (length to 12.9 mm). Fusiform, truncated anteriorly, of 9 convex whorls; apex slightly acuminate; axial sculpture predominant. Suture appressed; sulcus about 0.3 height of spire whorl, moderately excavated; shoulder round, or slightly angled in some specimens. Body whorl 61% of total shell length (56–62 % among intact specimens). Protoconch paucispiral, of 2 smooth slightly worn whorls, obscuring axial riblets, if present (Figure 6); 10.5 mm Baliceaux I. specimen has 10 riblets on last 0.5 whorl of protoconch (Figures 7). Axial sculpture of narrow, low, slightly opisthocline ribs, reduced in sulcus to mere raised lines that are hooked to left in an arc that reflects outline of anal sinus, thickest just below sulcus, tapering anteriorly, evanescent on shell base; 26 ribs on penultimate, 14 on last whorl (15–26 on penultimate, 11–22 on last whorl of examined specimens); ribs generally narrower than interspaces, variable, sometimes broad, indistinct, especially on body whorl. Growth striae present; visible in sulcus. Spiral sculpture of numerous spiral threads in sulcus, one or





**Figures 2–20.** *Crassispira* spp. **2–15.** *Crassispira* (*Crassiclava*) *affinis* (Reeve, 1846). **2.** *Pleurotoma affinis* Reeve, 1846. Drawing from Reeve, 1846: 34, fig. 309, 11.8 mm. **3.** USNM 1154261, Carriacou I., Grenada, 12.9 × 4.5 mm. **4.** BMSM 17955, Ronde I., Grenada, 12.4 × 5.0 mm. **5.** Same spec. as in 4, enlarged view of anterior lateral side. **6.** Protoconch, author's coll., Union I., SVG, 8.0 × 3.1 mm. **7.** Protoconch, ANSP 425811, Baliceaux I. SVG, 10.5 × 4.0 mm. **8.** Author's coll., Devil's Bay, Grenada, 9.8 × 4.2 mm. **9.** FLMNH 446785, Union I., SVG, 10.6 × 3.7 mm. **10.** Author's coll., Canouan I., SVG, 11.5 × 4.6 mm. **11.** Author's coll., Union I., SVG, 10.0 × 3.5 mm. **12.** Author's coll., Union I., SVG, 9.4 × 3.7 mm. **13.** ANSP 425811, Baliceaux I. SVG, 10.5 × 4.0 mm. **14.** Author's coll., Union I., SVG, 8.3 × 3.6 mm. **15.** BMSM 17954, Petit Nevis I., SVG, 10.7 × 4.5 mm. **16.** *Crassispira* (*Crassiclava*) *asthenes* Faber, 2007. Holotype, ZMA Moll. 4.07.057, Aruba, 11.4 × 4.2 mm (photograph courtesy Marien Faber). **17–20.** *Crassispira* (*Crassiclava*) *masinot* new species. **17.** Holotype, USNM 1154263, off Santa Martha Beach, Curaçao I., 10.7 × 3.8 mm. **18.** Holotype, enlargement of anterior lateral view. **19.** Paratype, ANSP 425814, type locality, 9.8 × 3.8 mm. **20.** Same spec. as in 19, enlarged view of protoconch.



more swollen; fine spiral grooves present on shell face overriding axial ribs; flattened cords on shell base that are slightly nodulose at intersection with axial ribs, nodules becoming more pronounced anteriorly. Seven (5–8) spiral ridges on anterior fasciole. Outer lip thin, projects a short distance out from base of varix, strengthened behind by short axial; shallow stromboid notch present (Figure 5). Varix, moderately large, angled at shoulder, appearing hump-like, positioned behind anal sinus. Anal sinus deep, round at its apex, bordered by parietal lobe on one side. Two low spiral ridges present on inside of outer lip (0–2 ridges in other specimens) strongest just below anal sinus underneath varix, its length same as width of varix; the other less well defined and broader, lies near stromboid notch and marks beginning of siphonal canal. Inner lip appressed along entire length; thickened anteriorly, very thin on parietal wall. Aperture narrowly oval and ends anteriorly in short unnotched siphonal canal. Shell color yellow-orange; specimens may also be light brown, orange-brown, yellow, and very pale lemon yellow. May or may not have brown spire tip. A sampling of color forms appears in Figures 8–15.

**Type Material:** Not located.

**Material Examined:** A total of 131 specimens from 12 localities have been examined:

1 spec.,  $11.8 \times 4.6$  mm, at 12 m, Petit Nevis I., SVG, G. Mackintosh!, 13 May 1993 (USNM 1154259); 2 spec.,  $10.7 \times 4.5$  (Figure 15) and  $10.1 \times 4.2$  mm (both decollate), at 7.6 m, Petit Nevis I., SVG, G. Mackintosh! 16 May 1993 (BMSM 17954); 1 spec.,  $10.3 \times 3.8$  mm, at 7.6 m, Petit Nevis, SVG, G. Mackintosh! 14 Jul 1996 (author's coll.); 2 spec.,  $10.5 \times 4.0$  (Figures 7, 13) and  $9.6 \times 3.8$  mm, at 12.2 m, S end of Baliceaux I., SVG, G. Mackintosh!, 23 Apr 1997 (ANSP 425811); 6 spec.,  $10.2 \times 3.8$ ,  $10.2 \times 4.1$ ,  $9.2 \times 3.8$ ,  $10.8 \times 4.0$ ,  $9.6 \times 3.3$ , and  $11.4 \times 4.2$  mm, at 4.6–7.6 m, Corbay Bay, Canouan I., SVG, G. Mackintosh! 6–9 June 2004 (USNM 1154260); 1 spec.,  $11.5 \times 4.6$  mm (Figure 10), at 4.6 m, Dove Cay, Canouan I., SVG, G. Mackintosh! 6 June 2004 (author's coll.); 21 spec., largest  $10.8 \times 4.0$ , smallest  $7.4 \times 3.1$  mm, at 5.5 m, Corbay Bay, Canouan I., SVG, G. Mackintosh! 6 Dec 2006 (author's coll.); 2 spec.,  $11.3 \times 4.2$  and  $9.4 \times 3.7$  mm (Figure 12), at 20 m, 0.4 km E of "Bloody Head", NW Union I., SVG, R. Masino! 31 Aug 2010 (author's coll.); 22 spec., largest  $11.6 \times 4.4$ ,  $10.0 \times 3.5$  (Figure 11), and smallest  $7.9 \times 3.2$  mm, at 18 m, Chatham Bay, Union I., SVG, G. Mackintosh! 6 Apr 2007 (author's coll.); 5 spec.,  $10.7 \times 3.8$ ,  $8.8 \times 3.4$ ,  $8.9 \times 3.3$ ,  $7.8 \times 2.9$ , and  $8.1 \times 2.9$  mm, at 9 m, Clifton Harbor, Union I., SVG, G. Mackintosh! 10 May 2007 (ANSP 425810); 8 spec.,  $10.6 \times 3.7$  (Figure 9),  $10.2 \times 3.6$ ,  $11.1 \times 3.9$ ,  $10.1 \times 3.7$ ,  $8.6 \times 3.3$ ,  $8.3 \times 3.0$ ,  $8.0 \times 3.3$ , and  $7.6 \times 2.7$  mm, at 11 m, Clifton Harbor, Union I., SVG, G. Mackintosh! 30 May 2004 (FLMNH 446785); 56 spec., intertidal, crabbed and worn, up to  $10.6 \times 4.5$  mm, broken apex,  $8.3 \times 3.6$  mm specimen in Figure 14, Clifton Harbor, Union I., SVG, P. Fallon!, 16 Jun 2007

(author's coll.); 1 spec.,  $12.9 \times 4.5$  mm (Figure 3), at 9 m, NW coast, Carriacou I., Grenada, G. Mackintosh! Dec 1996 (USNM 1154261); 1 spec.,  $10.9 \times 4.2$  mm, at 15 m, SE corner, Ronde I., Grenada, G. Mackintosh! 25 Jan 1997 (author's coll.); 1 spec.,  $12.3 \times 5.0$  mm (Figures 4, 5), at 6.7 m, Ronde I., Grenada (BMSM 17955); 2 spec.,  $12.2 \times 5.3$  (broken tip) and  $10.7 \times 3.8$  mm (immature lip), at 4.6 m, Ronde I., Grenada, G. Mackintosh! 30 Dec 2006 (ANSP 425812); 1 spec.,  $8.9 \times 3.6$  mm, at 6.7 m, S side of Molinere Pt., Grenada, G. Mackintosh!, 18 Apr 2004 (author's coll.); 2 spec.,  $10.7 \times 4.1$  and  $8.7 \times 3.4$  mm, at 6.7 m, outside anchorage, St. Georges, Grenada, G. Mackintosh!, 24 Jun 2003 (USNM 1154262); 2 spec.,  $8.6 \times 3.7$  and  $9.8 \times 4.2$  mm (Figure 8), both decollate, at 9 m, Devil's Bay, Grenada (author's coll.).

**Type Locality:** "St. Vincent".

**Range:** St. Vincent and the Grenadines (Petit Nevis I., Baliceaux I., Canouan I., Union I.) and Grenada (Carriacou I., Ronde I., Grenada I.) (locations "10" and "11" in Figure 1).

**Remarks:** The similarity of Reeve's drawing (which is taken as representative of the type) to the specimens here identified as *Crassispira affinis* is illustrated by the juxtaposition of the drawing of *Pleurotoma affinis* (Reeve's pl. 34, fig. 309) with a  $12.9 \times 4.5$  mm specimen from Carriacou I., Grenada, in Figures 2 and 3. The drawing and selected specimen are very similar but there are some small differences that may be due to "artistic license". Axial ribs appear to end at the sulcus in the drawing, whereas they continue into the suture in specimens in hand, albeit much reduced. The anterior end of Reeve's drawing appears to be somewhat narrower, a feature characteristic of less mature shells. While the type of *C. affinis* would have been examined for subtle characters not shown in the drawing, the likelihood of a very similar but different species inhabiting the environs of St. Vincent and the Grenadines with the observed degree of similarity is remote, especially given the commonness of these specimens.

*C. affinis* is most easily recognized by its yellow or yellowish colors, which is unique among the *Crassiclava*. From *Crassispira* (*Crassiclava*) *asthenes* Faber, 2007 (Figure 16) it differs in having less regular axial ribs and a longer anterior canal. *Crassispira asthenes* is described as uniformly light brown in color (Faber, 2007: 123), not the yellow of *C. affinis* (the color of the specimen shown in Figure 16 is off).

*Crassispira* (*Crassiclava*) *masinoi* new species (Figures 17–20)

**Description:** Holotype  $10.7 \times 3.8$  mm, fusiform, truncated anteriorly, of 8.5 convex whorls; body whorl 56% of total shell length (paratype 57%). Suture appressed; sulcus moderately excavated, about 0.3 whorl high; shoulder round; axial sculpture predominant (Figures 17, 18).

Protoconch paucispiral, of 1.5 smooth whorls with 3 faint riblets at end (Figure 19). Axial sculpture of slightly opisthocline ribs, narrower than their interspaces, with occasionally 2 or 3 ribs bunched together on last whorl. Ribs reduced and hooked to left in sulcus, thickest just below sulcus, and extending to anterior fasciole; 21 ribs on penultimate, 14 on last whorl. Spiral sculpture of grooves of varying strengths on whorl face, fainter on axial rib crests, deeper in interspaces; more widely spaced and deeper on shell base such that axial ribs appear slightly nodulose. Sulcus without spiral cord; with microscopic spiral lines and growth striae in addition to axial ribs. Six spiral cords on anterior fasciole. Outer lip thin, edge smooth, strengthened behind by 3 short axial ribs; shallow stromboid notch present (Figure 18). Varix narrower at shoulder but abruptly broadens immediately below; positioned about 0.25 whorl before edge of outer lip. Anal sinus deep, round at its apex, open at lip edge. Inner lip appressed along its entire length, thicker anteriorly, thin in parietal area, and ending with large round parietal lobe posteriorly. Edge of lip and parietal lobe visibly layered. Low spiral ridge present inside inner lip just anterior to sinus and under varix, its length limited to width of varix. Aperture narrowly oval and ends anteriorly in short, open siphonal canal. Shell honey-colored; rib crests, mid-whorl band, and shoulder of varix whitish.

**Type Material:** Holotype: USNM 1154263. Paratype: 1 spec.,  $9.8 \times 3.8$  mm, type locality (ANSP 425814) (Figure 20).

**Type Locality:** 0.4 km WNW off Santa Martha Beach, 0.8 km W of Santa Martha Bay entrance, W coast, Curaçao I., Netherlands Antilles, at 34 m depth.

**Range:** Known only from the type locality (location “5” in Figure 1).

**Remarks:** *Crassispira masinoi* is a distinctive species recognizable by its honey-colored base color, whitish mid-whorl band and varix, lack of subsutural cord, and its single, paired, or triple axial ribs. It is closest in appearance to *C. asthenes* but that species has a different varix and possesses a subsutural cord. From *C. affinis* it differs in possessing axial ribs that extend to the anterior fasciole. Differences from other *Crassiclava* follow under their descriptions below.

**Etymology:** Robert Masino’s *Crassiclava*. Named for Mr. Robert Masino of Ft. Myers, Florida who collected the type specimens.

*Crassispira (Crassiclava) blanquilla* new species (Figures 21–26)

**Description:** Holotype  $10.2 \times 3.9$  mm (lengths to 10.3 mm), fusiform, truncated anteriorly; of 9 moderately convex whorls; axial sculpture is predominant. Suture appressed, scalloped by ribs; sulcus height approximately 0.3 whorl, moderately excavated. Body whorl 52%

of shell length (52–60%) (Figure 21). Protoconch paucispiral, of 2 smooth whorls, last 0.5 whorl with weak axials (Figure 22). Axial sculpture of narrow almost thread-like ribs, 25 on penultimate whorl, 20 on body whorl to varix (22–25 on penultimate, 15–20 on body whorl to varix of type specimens), narrower than interspaces, slightly opisthocline, extending from near suture to following suture, evanescent on shell base. Ribs in sulcus are curved to left reflecting outline of anal sinus, reduced in thickness and height, and terminate in slight swelling near suture in some specimens. Spiral sculpture of closely packed spiral threads in sulcus, 2 closest to suture swollen, flattened, override swollen ends of axial ribs (Figure 23); incised spiral lines cover remaining shell, faint or obsolete on rib crests, deeper in interspaces. Five spiral grooves on shell base cut axial ribs into low squarish nodules, a few shallower spiral incised lines lie in-between ridges. 5 or 6 spiral cords run along anterior fasciole. Outer lip thin and smooth, projecting out a short distance from a thickened varix, strengthened by an axial rib between varix and edge of lip. Varix broad, positioned behind anal sinus. Stromboid notch shallow, marking transition of aperture to short, open anterior canal, unnotched. Anal sinus deep, U-shaped, bordered on one side by heavy parietal lobe. Low spiral ridge present inside inner lip just anterior to sinus and under varix, its length limited to width of varix. Inner lip is narrow, thick anteriorly, very thin on parietal wall and terminating in parietal lobe where outer lip joins. Shell color creamy white, rib crests paler, apex light brown; shell base and sulcus of holotype with diffuse bands of light brown; yellow or orange-yellow bands on some paratypes. Aperture color corresponds to specimens’ band color—brown, dark yellow or dark orange-yellow.

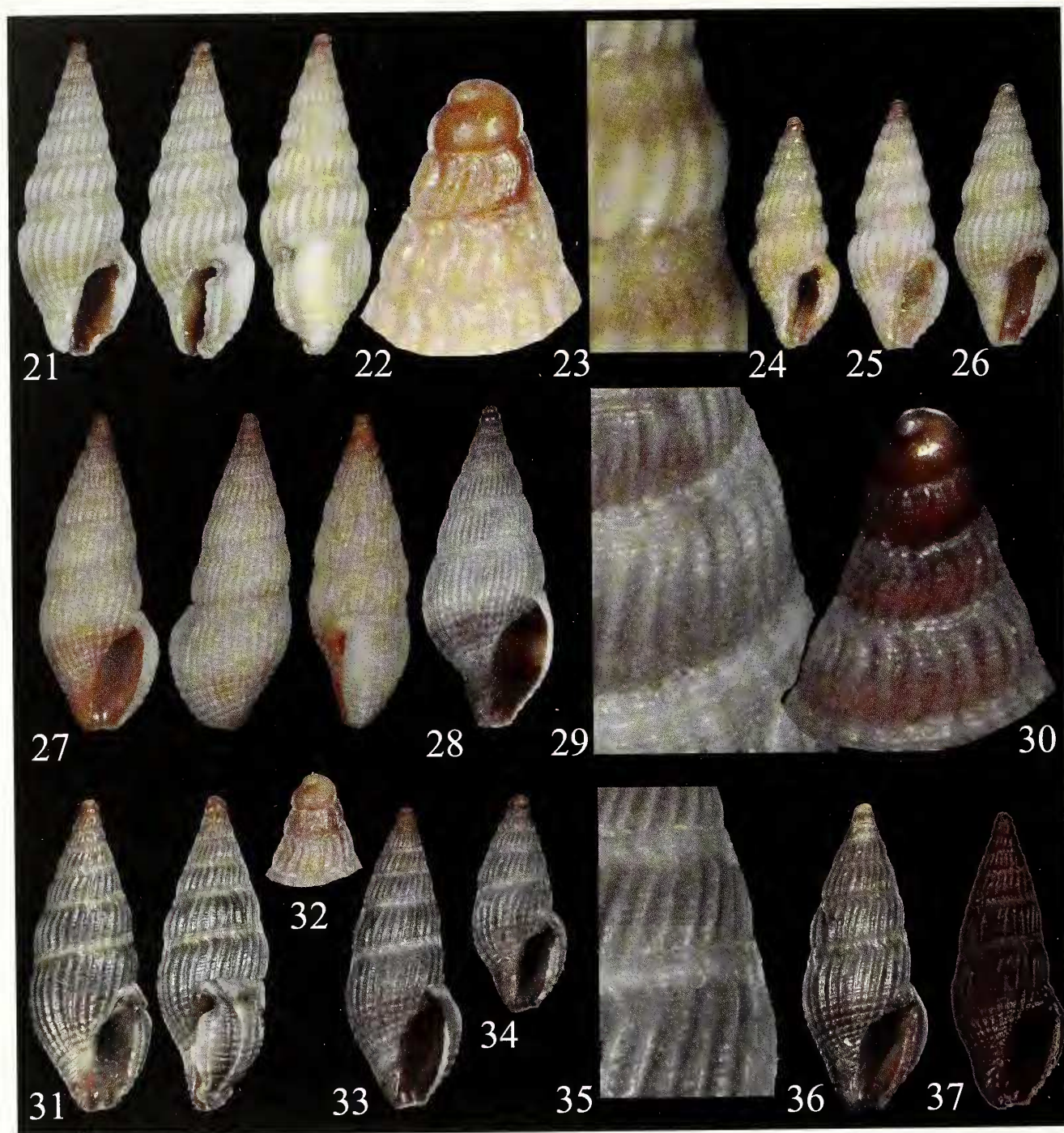
**Type Material:** Holotype: (USNM 1154264). Paratypes: 1 spec.,  $10.3 \times 3.9$  mm (missing protoconch), at 18.3 m, La Blanquilla I., Venezuela, G. Mackintosh!, 1 Jan 2000 (USNM 1154265); 2 spec.,  $6.2 \times 2.8$  and  $7.3 \times 2.8$  mm, at 7.6 m, La Blanquilla I., Venezuela, G. Mackintosh!, 4 Jan 2000 (ANSP 425813); 2 spec.,  $7.6 \times 3.1$  (Figure 24) and  $7.5 \times 3.0$  mm, at 7.6 m, La Blanquilla I., Venezuela, G. Mackintosh!, 4 Jan 2000 (FLMNH 446786); 2 spec.  $8.1 \times 3.3$  (Figure 25) and  $8.6 \times 3.5$  mm (Figures 23, 26), at 7.6 m, La Blanquilla I., Venezuela, G. Mackintosh!, 4 Jan 2000 (author’s coll.).

**Type Locality:** La Blanquilla Island, Venezuela, in 7.6–18 m depths.

**Range:** Known only from the type locality (location “8” in Figure 1).

**Remarks:** *Crassispira blanquilla* differs from *C. affinis* in having more uniformly spaced axials ribs, and in possessing a darker colored aperture. From *C. asthenes* it differs in having a more pinched shell base, and different coloration; *C. asthenes* is uniformly light brown with the protoconch paler whereas *C. blanquilla* is creamy white, with a brown protoconch. From *C. masinoi* it





**Figures 21–37.** *Crassispira* spp. **21–26.** *Crassispira* (*Crassiclava*) *blanquilla* new species, all from type locality. **21.** Holotype, USNM 1154264, 10.2 × 3.9 mm. **22.** Holotype, enlarged view of protoconch. **23.** Paratype, Author's coll., 8.6 × 3.5 mm, enlarged view showing sulcus. **24.** Paratype, FLMNH 446786, 7.6 × 3.1 mm. **25.** Paratype, author's coll., 8.1 × 3.3 mm. **26.** Paratype, author's coll., type locality, 8.6 × 3.5 mm. **27–30.** *Crassispira* (*Crassiclava*) *multicostata*, new species, all from off El Supi, Paraguaná Peninsula, Venezuela. **27.** Holotype, USNM 1154266, 11.0 × 4.3 mm. **28.** Paratype, USNM 1154267, 10.4 × 4.1 mm. **29.** Enlarged view of sulcus of paratype. **30.** Enlarged view of protoconch of paratype. **31–37.** *Crassispira* (*Crassiclava*) *mackintoshi* new species. **31.** Holotype, USNM 1154268, Los Testigos Is., Venezuela, 10.2 × 3.9 mm. **32.** Holotype, enlarged view of protoconch. **33.** Paratype, ANSP 425815, type locality, 9.8 × 3.7 mm. **34.** Paratype, BSM 17953, type locality, 7.0 × 3.0 mm. **35.** Enlarged view of sulcus, spec. in Figure 33. **36.** Author's coll., Cabo de La Vela, La Guajira Prov., Colombia, 9.9 × 4.0 mm. **37.** Specimen from off Los Monges Is., Venezuela, 9.6 mm (photograph courtesy Femorale).

differs in having more uniformly spaced axial ribs, spiral threads in the sulcus, and a shorter anterior canal. It also differs in coloration.

**Etymology:** Named after the type locality, La Blanquilla Island, Venezuela. Name in apposition.

*Crassispira (Crassiclava) multicostata* new species  
(Figures 27–30)

**Description:** Holotype  $11.0 \times 4.3$  mm, fusiform, anteriorly truncated, of 8.75 moderately convex whorls; axial sculpture is predominant (Figure 27). Suture appressed; sulcus, slightly excavated, narrow, width approximately 0.25 whorl height; shoulders round. Body whorl 55% of shell length (paratype 59%). Protoconch worn on holotype; of 2 glassy whorls with 8 riblets on last 0.5 whorl of paratype (Figure 30). Axial sculpture of fine, almost thread-like, slightly opisthocline ribs that extend to anterior fasciole on body whorl. Ribs slightly reduced and hooked to the left in sulcus, rib ends swollen near suture; microscopic growth striae between axial ribs. Distance between ribs variable; average about the same as their width; 35 ribs on penultimate, 30 on last whorl. Spiral sculpture of up to 5 threads in sulcus of last whorl (Figure 29), fewer in earlier whorls; spiral threads override axial ribs; no subsutural cord present. Shallow spiral grooves cover remaining portion of whorls, more widely spaced on shell base. Rib segments between spiral grooves slightly swollen, more so and forming 7 slightly nodulose rows on shell base. Seven smooth spiral cords on anterior fasciole. Outer lip chipped on holotype, so no visible stromboid notch; varix broad, about 4–5 axial ribs in width, and immediately precedes anal sinus. Anal sinus shallow, incompletely formed, paratype has thin, straight lip, sinus not yet formed. Inner lip narrow, thin and appressed to columella; weak parietal callus present where outer lip joins. Anterior canal very short, open, unnotched. Color creamy white, axial ribs white, broad orange band on shell base, spire apex and aperture dark orange. Paratype is purple-brown, axial ribs white, apex and aperture brown.

**Type Material:** Holotype: USNM 1154266; paratype:  $10.4 \times 4.1$  mm (Figure 28), from type locality (USNM 1154267) (A. Jorio and L. Couto!).

**Type Locality:** Off El Supi, Paraguaná Peninsula, Falcón, Venezuela, in 33 m depth.

**Range:** Known only from the type locality (location “4” in Figure 1).

**Remarks:** *Crassispira multicostata* is easily distinguished from other *Crassiclava* by its greater number of axial ribs. From *C. affinis* it differs in having a shorter anterior canal, and thinner, more and better defined ribs, and in coloration. From *C. asthenes* it also differs in coloration (*C. asthenes* is uniformly light brown). From *C. masinoti* it also differs in having a narrower sulcus and in possessing spiral threads in the sulcus. Its coloration

is similar to *C. blanquilla*, but it differs in having slightly less convex whorls and a narrower sulcus.

**Etymology:** The Many-ribbed *Crassiclava*. From Latin *multi*—many and *costata*—ribbed. This species has more axial ribs than any other known *Crassiclava*.

*Crassispira (Crassiclava) mackintoshi* new species  
(Figures 31–36)

**Description:** Holotype  $10.2 \times 3.9$  mm (lengths to 12.4 mm), compact-oval shape, of 8.5 convex whorls total. Suture appressed; sulcus narrow, only slightly excavated, approximately 0.25 whorl in height; shoulder round, whorls slightly convex. Body whorl 54.9% of shell length (55–65% in examined specimens) (Figure 31). Protoconch paucispiral, of 1.75 whorls; last 0.5 whorl with 6 weak axials, the first few weakest, visible only on whorl's shoulder (Figure 32). Teleoconch of 6.25 whorls; axial sculpture is predominant. Axial sculpture of narrow, slightly opisthocline ribs narrower than interspaces, extending from suture to suture, slightly swollen at their ends near the suture, curved or hooked left in sulcus, reflecting outline of anal sinus and reduced in thickness and height; evanescent on base of shell. Ribs number 30 on penultimate, 27 on last whorl (range is 24–31 on penultimate, 18–30 on last whorl). Spiral sculpture of closely packed threads in sulcus, those near suture swollen (Figure 35); incised spiral lines on whorl face, faint on rib crests but distinct in interspaces; of 6 spiral cords on shell base that cut axials into squarish, low nodules at intersection with axial ribs; 7 spiral cords on anterior fasciole. Outer lip thin, smooth, projects out a short distance from varix, which is positioned behind anal sinus, strengthened by a rib; low spiral ridge present on inside of outer lip just below anal sinus. Anal sinus deep, U-shaped, bordered on one side by heavy parietal lobe. Stromboid notch marks transition of aperture to short, open anterior canal. Inner lip is narrow, appressed to columella, thick anteriorly, very thin on parietal wall. Base color dark gray; shell apex, columella, and tip of anterior canal brown; very light gray to white band present below suture; crests of axial ribs and spiral cords on anterior canal white. An all-brown form exists.

**Type Material:** Holotype: USNM 1154268. Paratypes, all from the type locality: 2 spec.,  $9.8 \times 3.7$  (Figure 33, 35) and  $6.8 \times 3.0$  mm (ANSP 425815); 2 spec.,  $9.3 \times 3.5$  and  $6.9 \times 3.0$  mm, missing protoconch (FLMNH 446787); 2 spec.,  $7.0 \times 3.0$  (Figure 34) and  $7.5 \times 3.0$  mm, broken protoconch (BMSM 17953); 2 spec.,  $8.8 \times 3.6$  and  $8.1 \times 3.6$  mm, broken spire (P. Williams coll.).

**Type Locality:** North of Testigos Grande, Los Testigos Islands, Venezuela, at 6.1 m depth (G. Mackintosh!, 10 Oct 1999).

**Material Examined:** 3 spec.,  $12.4 \times 4.7$ ,  $10.2 \times 3.8$ , and  $9.9 \times 4.0$  mm (Figure 36), at 4–10 m, Cabo de La Vela, Guajira Province, Colombia, A. Jorio and L. Couto! (author's coll.).



**Range:** Los Testigos Is., Venezuela, Cabo de la Vela, Guajira (locations "9" and "1", respectively, in Figure 1).

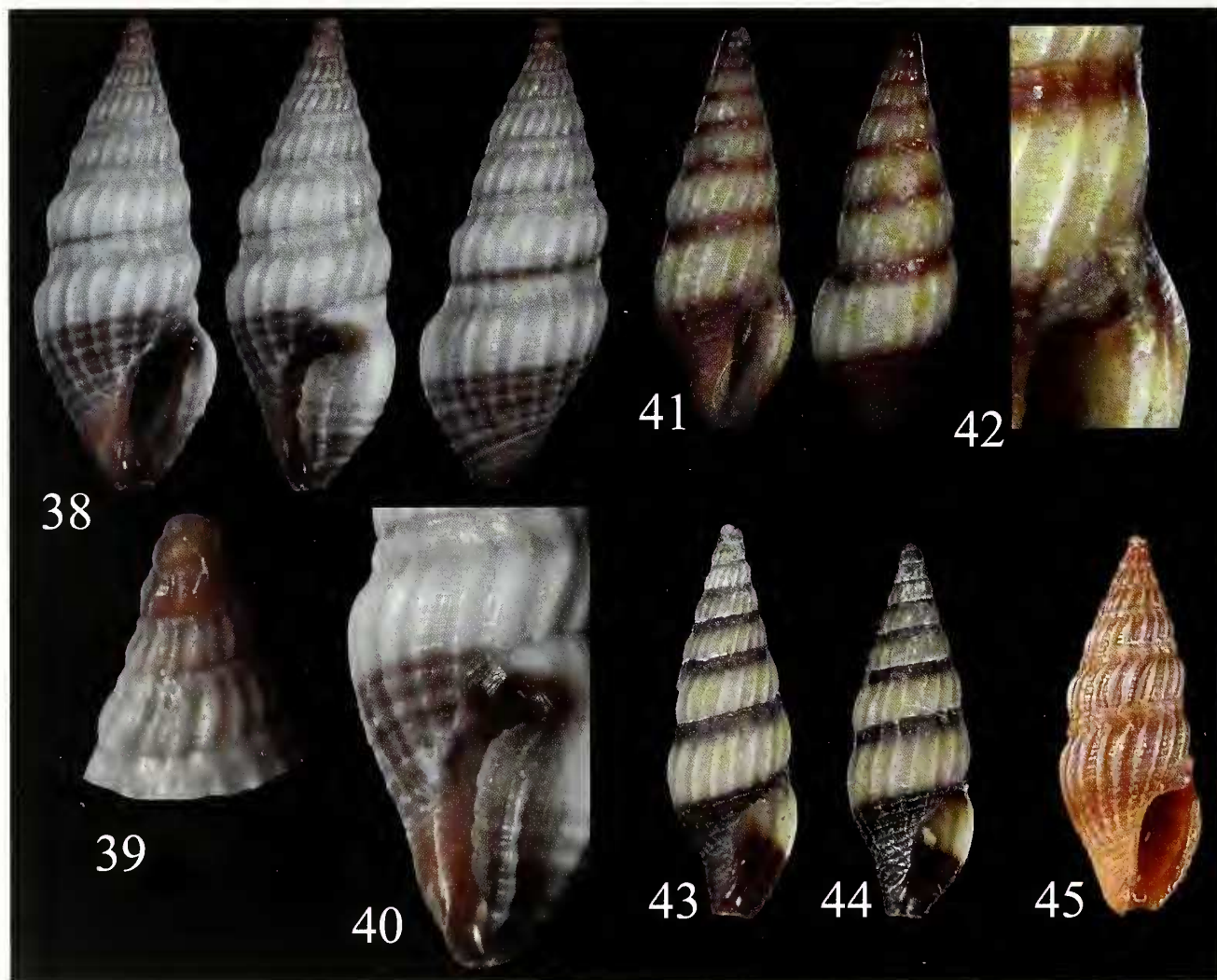
**Remarks:** A 9.6 mm specimen depicted on Femorale's Photo Gallery website (Coltro and Coltro, 1999) from Los Monges, Venezuela, may be this species (Figure 37, location "2" in Figure 1). A very similar but undescribed species from La Tortuga I., Venezuela (location 7 in Figure 1) is shown in Figure 45. *Crassispira mackintoshi* is closest to *C. multicostata* but differs in the arrangement of spiral threads in the sulcus, and has fewer axial ribs. It differs from *C. affinis*, *C. asthenes*, *C. masinoi*, and *C. blanquilla* in having a shallower, narrower anal sulcus and a more compact-oval shape. It is also a different color, dark gray with white axials, not yellow as in *C. affinis*, or uniformly light brown as in *C. asthenes*, or

honey-colored as in *C. masinoi*, or creamy white as in *C. blanquilla*.

**Etymology:** Named for one of the collectors of the type specimens, and most of the specimens presented in this paper, Gary Mackintosh.

*Crassispira* (*Crassiclava*) *cana* new species  
(Figures 38–40)

**Description:** Holotype 11.4 × 4.4 mm, fusiform, of 8.5 strongly convex whorls; axial sculpture predominant. Suture appressed, slightly scalloped by underlying ribs of preceding whorl; sulcus excavated, about 0.25 height of spire whorl (Figure 38). Body length 57% of total shell length. Protoconch paucispiral, of 2 smooth but not glossy whorls, last 0.5 whorl with 8–9 fine riblets



**Figures 38–45.** *Crassispira* spp. 38–40. *Crassispira* (*Crassiclava*) *cana* new species. 38. Holotype, USNM 1154269, 11.4 × 4.4 mm. 39. Holotype, enlarged view of protoconch. 40. Holotype, enlarged view of anterior lateral half. 41–44. *Crassispira* (*Crassiclava*) *vexillum* (Reeve, 1845). 41. Holotype, NHMUK 1900.3.9.38, 9.7 × 3.5 mm. 42. Holotype, enlarged view of parietal callus. 43. USNM 1154270, Young I., SVG, 9.6 × 3.2 mm. 44. FLMNH 446788, Young I., SVG, 9.1 × 3.1 mm. 45. *Crassispira* (*Crassiclava*) sp. Unidentified species from off La Tortuga I., Venezuela, 9.3 mm (photograph courtesy Femorale).



(Figure 39). Axial sculpture of fine, slightly opisthocline axial ribs, hooked to the left in sulcus, with ends swollen near suture; some ribs finely, unequally bifurcated on shell base; 19 axial ribs on the penultimate whorl, 16 on last whorl to varix. Microscopic growth striae in sulcus, also hooked to the left. Spiral sculpture of indistinct and irregularly spaced shallow incised lines between ribs, absent on rib crests, more closely packed in sulcus. No subsutural cord. Shell base with 5–6 evenly spaced flattened spiral cords, nodulose at their intersection with axial ribs. Five spiral cords on anterior fasciole. Outer lip thin, projects out from a thickened varix, slightly scalloped by the spiral cords; reinforced by a rib; shallow stromboid notch present (Figure 40). Varix broad and swollen, positioned a little behind the anal sinus. Anal sinus deep, U-shaped, bordered by the parietal callus. Inner lip is narrow, appressed to columella; thickened anteriorly, and posteriorly into heavy parietal callus where it joins the outer lip. Shell color white with dark purple-brown shell base, which is incompletely overlapped by succeeding whorls; aperture dark purple-brown. Rib crests, some spiral cords, and varix white; shell apex, anterior canal, and fasciole brown, not purple-brown.

**Type:** Holotype: USNM 1154269.

**Type Locality:** Aves de Sotavento, Las Aves archipelago, Federal Dependency, Venezuela, in 7–10 m.

**Range:** Known only from the type locality (location “6” in Figure 1). Both specimens shown on the Femorale’s Photo Gallery website (Coltro and Coltro, 1999; numbers 37594 and 42682) are from Sotavento, Las Aves, and were collected by G. Mackintosh Oct 1998 (M. Coltro pers. comm. 29 Sep 2009).

**Remarks:** *Crassispira cana* is unique in its coloration among *Crassiclava*. From *C. affinis* it also differs in lacking subsutural spiral threads and in having only a few spiral incised lines overriding the ribs. *Crassispira affinis*, has less distinct ribs, and less distinct axial rib traces in the sulcus. From *C. blanquilla* it differs in having fewer axials (19 vs. 22–25 on their respective penultimate whorls); from *C. mackintoshii* it differs in being broader, in having a wider sulcus, fewer axials (19 vs. 24–31 on the penultimate), and lacking spiral elements in the sulcus. From *C. vexillum* it differs in having more convex whorls giving it a more shouldered appearance, a broader sulcus with heavier rib traces, stronger spiral cords on the shell base, and the crests of ribs and cords on the body are white—not the same color as the band, as is the case with *C. vexillum*.

**Etymology:** White-capped *Crassiclava*. “Cana” is the feminine form of the Latin adjective *canus*, one of whose meanings is white-capped (Oxford Latin Dictionary). The peculiar coloring of this species, which appears to be a consistent trait, brings to mind a snow-capped peak.

*Crassispira (Crassiclava) vexillum* (Reeve, 1845)  
(Figures 41–44)

*Pleurotoma vexillum* Reeve, 1845: pl. 29, fig. 264; Higgins and Marrat (1877); Paetel (1888).

*Drillia vexillum* (Reeve, 1845): Tryon (1884: 209, pl. 13, fig. 72).

*Crassispira vexillum* (Reeve, 1845): Maes (unpublished, per Rosenberg, 2009); Williams (2005: number 3117).

Not *Drillia vexillum* (Reeve, 1845): Hidalgo (1904) and Hedley (1913) for Indo-Pacific species.

**Description:** Holotype 9.7 × 3.5 mm, narrowly fusiform, of 8 slightly convex whorls; suture appressed; sulcus narrow, flat to slightly convex, approximately 0.25 height of whorl; body whorl 65% of the total length; axial sculpture predominant (Figure 41). Other examined specimens are 9.1–9.6 mm in length, with immature lips. Protoconch of holotype worn, the 9.6 mm specimen (USNM 1154270) has 2 smooth dark brown whorls and few weak axials on last 0.25 whorl. Axial sculpture consists of narrow, well defined and slightly opisthocline ribs, reduced in sulcus to fine arcuate lines, ends swollen near the suture. Ribs evanesce on shell base; number 19 on penultimate and 13 to varix on body whorl of holotype, 18 on penultimate on other 2 examined specimens. Spiral sculpture in sulcus of threads, heaviest near suture, and together with swollen axial ends form nodulose subsutural fold. Spiral threads present on remainder of whorl, but fade on rib crests; approximately 5 well-spaced spiral cords on body whorl slightly nodulose at intersection with axials, with very fine threads between them. Six or 7 spiral cords on anterior fasciole. Outer lip broken, partially missing in holotype; with U-shaped anal sinus and large parietal lobe; stromboid notch not evident on broken lip. Aperture narrowly oval; anterior canal short, open. Shell color ivory white with chocolate-colored band anteriorly, and narrower one on sulcus; color shows through inside shell aperture.

**Type:** Holotype: NHMUK 1900.3.9.38.

**Type Locality:** Unknown to Reeve; herein designated as Young I., St. Vincent and the Grenadines.

**Material Examined:** 1 spec. 9.6 × 3.2 mm (Figure 43), at 4.6–10.7 m, Young I., SVG, G. Mackintosh!, 1998 (USNM 1154270); 1 spec., 9.1 × 3.1 mm (Figure 44), at 4.6 m, Young I., SVG, G. Mackintosh!, 3 Sep 2000 (FLMNH 446788). Only photographs of the following were examined: Femorale’s Photo Gallery website species 62659 (Coltro and Coltro, 1999), 10 mm, at 50–70 m, Bequia I., SVG (Carlos Henckes, pers. comm., 20 Jul 2009); Williams (2009: number 3117), Young I., SVG (Peggy Williams, pers. comm., 20 Jul 2009).

**Range:** St. Vincent and the Grenadines (Young I., and Bequia I.), location “12” in Figure 1. No specimens have been found in museum collections or in more recent publications to confirm Barbuda as a valid locality as reported by Higgins and Marrat (1877).

**Remarks:** *Crassispira vexillum* is easily distinguished from other *Crassiclava* by its small size (usually less than 10 mm in length), narrowly fusiform shape, and unique

coloration. The chocolate-colored banding is present on all specimens examined, and on all others seen in photographs. Its inclusion in *Crassiclava* is based on the presence of a heavy parietal lobe at the front of the anal sinus, thin axial ribs that extend from suture to suture, spiral threads confined to rib interstices except on the shell base, and a weakly formed subsutural cord.

Reeve described this species without locality. Higgins and Marrat (1877) included this taxon among the specimens taken in the Argo Expedition to the West Indies in 1876. The first modern worker to recognize this as a Western Atlantic species, over 130 years after its original description, was V.O. Maes (unpublished, per Rosenberg, 2009). Since then, specimens have been figured by Williams and on the internet on Femorale's Photo Gallery (Coltro and Coltro, 1999), and all reportedly found around St. Vincent I., the type locality assigned herein. In addition to St. Vincent, Higgins and Marrat (1877) listed Barbuda as a locality, but this cannot be verified as the whereabouts of their specimens have not been found.

Tryon (1884: 209) lists this species from Port Jackson, Australia. Hidalgo (1904) and Hedley (1913), also list the species from the Indo-West Pacific. No subsequent references citing occurrence of this species in the Indo-Pacific have been found in the literature, so these reports are interpreted as misidentifications or miss-localizations, especially in light of the close match to Reeve's type of specimens collected from SVG in recent years.

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